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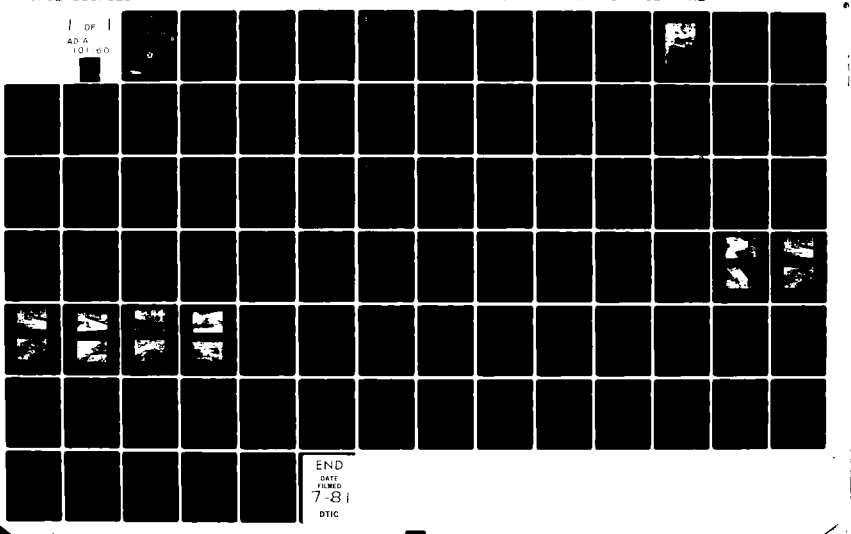

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MORRIS COUNTY
NEW JERSEY

COOKS POND DAM

NJ00810

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PHASE 1 INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

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DEPARTMENT OF THE ARMY
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REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

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3. RECIPIENT'S CATALOG NUMBER	
4. TITLE (and Subtitle): Phase I Inspection Report National Dam Safety Program Cooks Pond Dam, NJ00810 Morris County, N.J.	5. TYPE OF REPORT & PERIOD COVERED: FINAL 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s): McDermott, Richard J., P.E. Gribbin, John E., P.E.	8. CONTRACT OR GRANT NUMBER(s): DACW61-79-C-0011
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18. SUPPLEMENTARY NOTES

Copies are obtainable from National Technical Information Service, Springfield, Virginia 22151.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dams
Embankments
Visual Inspection
Structural Analysis
National Dam Safety Program
Cooks Pond Dam, N.J.
Spillways
Riprap
Seepage

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report.

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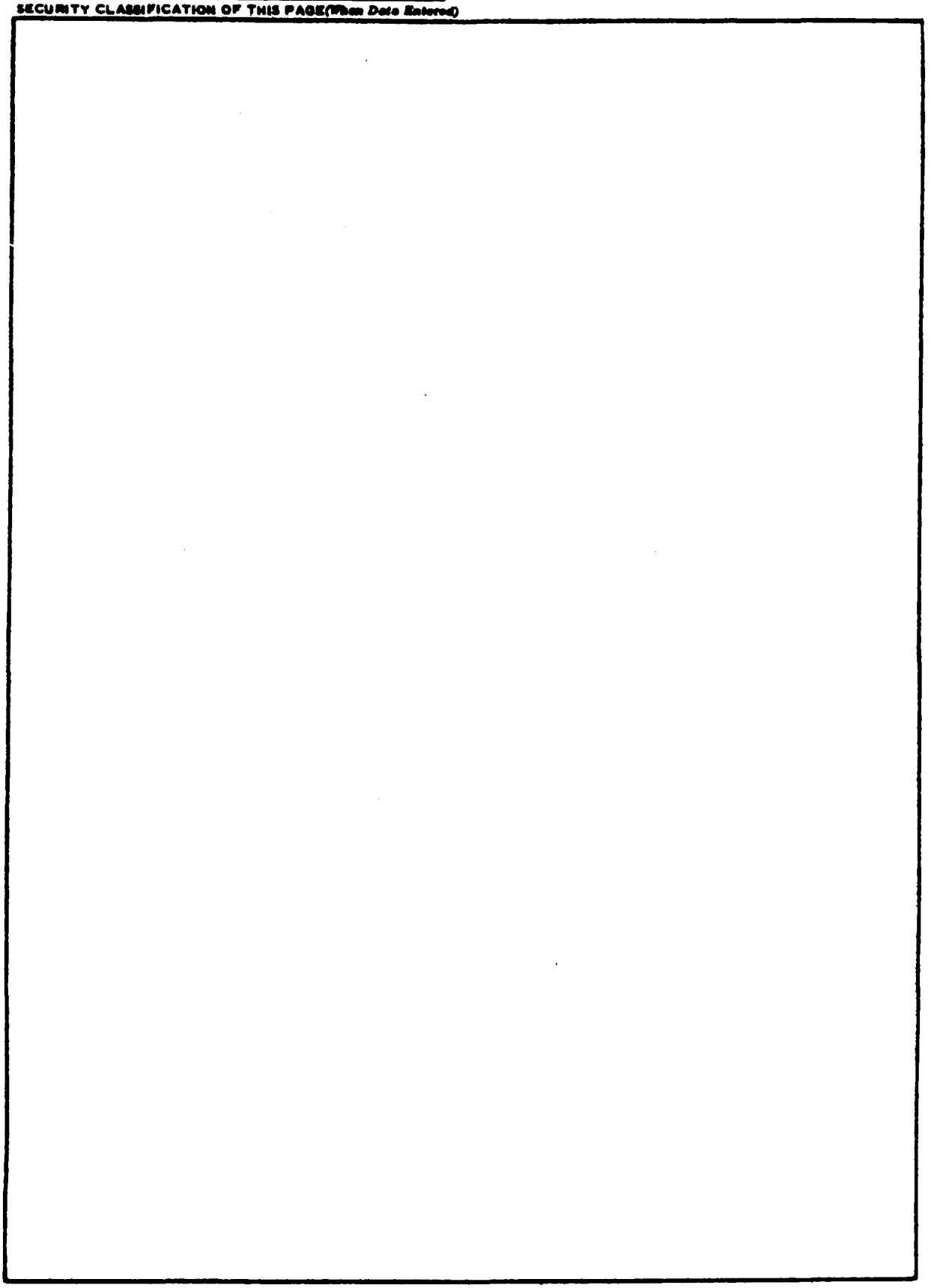

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT, CORPS OF ENGINEERS
CUSTOM HOUSE—2 D & CHESTNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

IN REPLY REFER TO
NAPEN-N

Honorable Brendan T. Byrne
Governor of New Jersey
Trenton, New Jersey 08621

15 JUL 1981

Dear Governor Byrne:

Inclosed is the Phase I Inspection Report for Cooks Pond Dam in Morris County, New Jersey which has been prepared under authorization of the Dam Inspection Act, Public Law 92-367. A brief assessment of the dam's condition is given in the front of the report.

Based on visual inspection, available records, calculations and past operational performance, Cooks Pond Dam, initially listed as a high hazard potential structure, but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in fair overall condition and the spillway is considered adequate. To ensure adequacy of the structure, the following actions, as a minimum, are recommended:

a. Within one year from the date of approval of this report the following remedial actions should be initiated:

(1) The spillway discharge chamber and discharge channel should be cleaned of debris.

(2) Soil on the downstream side of the embankment should be properly graded, compacted and stabilized.

(3) Trees and adverse vegetation on the embankment should be removed.

(4) Deteriorated stoplogs should be replaced.

(5) Riprap on the upstream side of dam should be renovated.

(6) The crest of dam should be properly stabilized.

(7) The observed seepage should be monitored on a periodic basis by a professional engineer experienced in the design and construction of dams in order to detect any changes in condition.

b. The owner should develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam within one year from the date of approval of this report.

c. An emergency action plan should be developed which outlines actions to be taken by the owner to minimize the downstream effects of an emergency at the dam within six months from the date of approval of this report.

A copy of the report is being furnished to Mr. Dirk C. Hofman, New Jersey Department of Environmental Protection, the designated State Office contact for this program. Within five days of the date of this letter, a copy will also be sent to Congressman Courter of the Thirteenth District. Under the provision of the Freedom of Information Act, the inspection report will be subject to release by this office, upon request, five days after the date of this letter.

Additional copies of this report may be obtained from the National Technical Information Services (NTIS), Springfield, Virginia 22161 at a reasonable cost. Please allow four to six weeks from the date of this letter for NTIS to have copies of the report available.

An important aspect of the Dam Inspection Program will be the implementation of the recommendations made as a result of the inspection. We accordingly request that we be advised of proposed actions taken by the State to implement our recommendations.

Sincerely,

JAMES G. TON
Colonel, Corps of Engineers
Commander and District Engineer

1 Incl
As stated

Copies furnished:
Mr. Dirk C. Hofman, P.E., Deputy Director
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

Mr. John O'Dowd, Acting Chief
Bureau of Flood Plain Regulation
Division of Water Resources
N.J. Dept. of Environmental Protection
P.O. Box CN029
Trenton, NJ 08625

COOKS POND DAM (NJ00810)

CORPS OF ENGINEERS ASSESSMENT OF GENERAL CONDITIONS

This dam was inspected on 15 December 1980 and 12 March 1981 by Storch Engineers, under contract to the State of New Jersey. The State, under agreement with the U.S. Army Engineer District, Philadelphia, had this inspection performed in accordance with the National Dam Inspection Act, Public Law 92-367.

Cooks Pond Dam, initially listed as a high hazard potential structure, but reduced to a significant hazard potential structure as a result of this inspection, is judged to be in fair overall condition and the spillway is considered adequate. To ensure adequacy of the structure, the following actions, as a minimum, are recommended:

a. Within one year from the date of approval of this report the following remedial actions should be initiated:

(1) The spillway discharge chamber and discharge channel should be cleaned of debris.

(2) Soil on the downstream side of the embankment should be properly graded, compacted and stabilized.

(3) Trees and adverse vegetation on the embankment should be removed.

(4) Deteriorated stoplogs should be replaced.

(5) Riprap on the upstream side of dam should be renovated.

(6) The crest of dam should be properly stabilized.

(7) The observed seepage should be monitored on a periodic basis by a professional engineer experienced in the design and construction of dams in order to detect any changes in condition.

b. The owner should develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam within one year from the date of approval of this report.

c. An emergency action plan should be developed which outlines actions to be taken by the owner to minimize the downstream effects of an emergency at the dam within six months from the date of approval of this report.

APPROVED: James G. Ton

JAMES G. TON
Colonel, Corps of Engineers
Commander and District Engineer

DATE: 15 Jun 1981

PHASE I REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Cooks Pond Dam, NJ00810
State Located:	New Jersey
County Located:	Morris
Drainage Basin:	Passaic River
Stream:	Tributary to Rockaway River
Dates of Inspection:	December 15, 1980
	March 12, 1981

Assessment of General Condition of Dam

Based on available records, past operational performance, visual inspections and Phase I engineering analysis, Cooks Pond Dam is assessed as being in fair overall condition.

Based on investigations of the downstream flood plain made in connection with this report, it is recommended that the hazard potential classification be downgraded from high to significant hazard.

The spillway is capable of passing the designated spillway design flood (100-year storm) without an overtopping of the dam and, therefore, is assessed as being adequate.

It is recommended that the following remedial measures be undertaken by the owner in the future:

1) The spillway discharge chamber and discharge channel should be cleaned of debris.

2) Soil on the downstream side of the embankment should be properly graded, compacted and stabilized.

3) Trees and adverse vegetation on the embankment should be removed.

4) Deteriorated stoplogs should be replaced.

5) Riprap on the upstream side of dam should be renovated.

6) The crest of dam should be properly stabilized.

The observed seepage should be monitored on a periodic basis by a professional engineer experienced in the design and construction of dams in order to detect any changes in condition.

In the future, the owner of the dam should develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam.

Richard J. McDermott, P.E.

John E. Gribbin, P.E.

OVERVIEW - COOKS POND DAM

20 JANUARY 1981

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. It is important to note that the condition of dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that the unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydraulic and hydrologic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydraulic and hydrologic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

COOKS POND DAM, I.D. NJ00810

SECTION 1: PROJECT INFORMATION

1.1 General

a. Authority

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The Division of Water Resources of the New Jersey Department of Environmental Protection (NJDEP) in cooperation with the Philadelphia District of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the State of New Jersey. Storch Engineers has been retained by the NJDEP to inspect and report on a selected group of these dams. The NJDEP is under agreement with the Philadelphia District of the Corps of Engineers.

b. Purpose of Inspection

The visual inspections of Cooks Pond Dam were made on December 15, 1980 and March 12, 1981. The purpose of the inspections was to make a general assessment of the structural integrity and operational adequacy of the dam structure and its appurtenances.

1.2 Description of Project

a. Description of Dam and Appurtenances

The dam consists of an earth embankment with a spillway structure located near the center. The upstream face to the right of the spillway is formed by a concrete and stone masonry wall. The spillway consists of timber stoplogs fitted in a concrete headwall and discharges into an inlet chamber and then through two 18-inch concrete pipes and one 15-inch concrete pipe.

The elevation of the spillway crest is 528.0, National Geodetic Vertical Datum (N.G.V.D.) while that of the outlet invert is 521.8. The crest of the dam is at elevation 530.1 and the downstream channel bed is 521.8. The overall length of the dam is 443 feet and its height is 8.3 feet.

b. Location

Cooks Pond Dam is located in the Township of Denville, Morris County, New Jersey. Principal access to the dam is through a residential development which is entered from Diamond Spring Road at a point 1.7 miles north of N.J. Route 46. Discharge from the spillway of the dam flows into a tributary to the Rockaway River.

c. Size and Hazard Classification

The dam is classified in accordance with criteria presented in "Recommended Guidelines for Safety Inspection of Dams" published by the U.S. Army Corps of Engineers. Size categories consist of Small, Intermediate and Large while hazard categories are designated as Low, Significant and High.

Size Classification: Cooks Pond Dam is classified as "Small" size since its maximum storage volume is 99 acre-feet (which is less than 1000 acre-feet) and its height is 8.3 feet (which is less than 40 feet).

Hazard Classification: Visual inspection of the downstream flood plain of the dam together with breach analysis indicate that failure of the dam would not result in inundation of dwellings located within 3500 feet from the dam. Dam failure could cause damange to public roadways located 100 feet, 1500 feet and 3500 feet downstream from the dam. Accordingly, Cooks Pond Dam is classified as "Significant" hazard.

d. Ownership

Cooks Pond Dam is privately owned by F.L. Petrozzo, Jr. and P.D. Palmer, P.O. Box 771, Bernardsville, N.J. 07924.

e. Purpose of Dam

The purpose of the dam is the impoundment of a lake used for recreation.

f. Design and Construction History

Cooks Pond Dam reportedly was constructed in or about 1945. Reportedly, no records or plans for the dam are on file.

g. Normal Operational Procedures

The dam and its appurtenances are repaired on an "as needed" basis. The water level in the lake is partially lowered by means of stoplogs once or twice a year for maintenance purposes.

1.3 Pertinent Data

a.	Drainage Area	0.14 square miles
b.	Discharge at Damsite	
	Maximum flood at damsite	Unknown
	Outlet Works at pool elevation	40 cfs
	Spillway capacity at top of dam	44 cfs
c.	Elevation (N.G.V.D.)	
	Top of Dam	530.1
	Maximum pool-design surcharge	529.0
	Spillway crest	528.0
	Stream bed at toe of dam	521.8
	Maximum tailwater	524 (Estimated)
d.	Reservoir	
	Length of maximum pool	1200 feet (Estimated)
	Length of recreation pool	1000 feet (Scaled)
e.	Storage (Acre-feet)	
	Recreation pool	59 acre-feet
	Design surcharge	77 acre-feet
	Top of dam	99 acre-feet
f.	Reservoir Surface (acres)	
	Top of dam	20 acres (Estimated)
	Maximum pool - design surcharge	19 acres (Estimated)
	Recreation pool	17.5 acres

SECTION 2: ENGINEERING DATA

2.1 Design

No plans or calculations pertaining to the original design of the dam could be obtained.

2.2 Construction

No data or reports pertaining to the construction of the dam are available.

2.3 Operation

No data or reports pertaining to the operations of the dam are available.

2.4 Evaluation

a. Availability

There is no available engineering data pertaining to the original construction of the dam.

b. Adequacy

Available engineering data pertaining to Cooks Pond Dam is not adequate to be of significant assistance in the performance of a Phase I evaluation. A list of absent information is included in paragraph 7.1.b.

c. Validity

The validity of engineering data cannot be assessed due to the absence of data.

SECTION 3: VISUAL INSPECTION

3.1 Findings

a. General

The inspections of Cooks Pond Dam were performed on December 15, 1980 and March 12, 1981 by staff members of Storch Engineers. A copy of the visual inspection check list is contained in Appendix 1. The following procedures were employed for the inspection:

1) The embankment of the dam, appurtenant structures and adjacent areas were examined.
2) The embankment and accessible appurtenant structures were measured and key elevations determined by surveyor's level.
3) The embankment, appurtenant structures and adjacent areas were photographed.
4) The downstream flood plain was toured to evaluate downstream development and restricting structures.

b. Dam

Trees ranging in size from 2 inches to 12 inches were observed on the upstream and downstream sides of the embankment. The crest was generally grass covered with a pedestrian path located along its entire length. The concrete and stone masonry wall on the upstream side was in generally satisfactory condition. A one-foot gap between the wall and the spillway structure appeared to have been filled with rocks and mortar forming an unsatisfactory repair.

Riprap was observed along the upstream face to the left of the spillway. The stones had an average size of approximately 12 inches. The riprap was generally deteriorated.

Boulders were observed on the downstream side in the vicinity of the spillway structure. The boulders were haphazardly placed and did not appear to form a uniform slope stabilization. Voids in the soil behind the boulders were observed and sloughing of the embankment in the area of the boulders was noted. Evidence of loss of soil and insufficient compaction was also noted in the vicinity of the spillway.

On the downstream side of the dam, about 50 feet to the left of the spillway, an area of erosion was observed. The erosion appeared to be formed by pedestrian activity and surface runoff.

c. Appurtenant Structures

The spillway structure and discharge culverts appeared to be in generally satisfactory condition. However, a vertical crack about one-eighth inch wide was observed in one of the walls of the concrete chamber comprising the upstream portion of the spillway. The timber stoplogs fitted at the upstream end of the chamber were deteriorated. The chamber contained a significant accumulation of debris.

The concrete-lined discharge channel downstream from the dam was about half filled with leaves and rocks. It appeared to be in generally satisfactory condition.

d. Seepage

Water was discharging as a trickle from the right 18-inch culvert into the discharge channel. However, about 50 feet downstream, flow in the discharge channel had more quantity and contained orange colored deposits. The increased flow could indicate the emergence of seepage along the discharge channel.

d. Reservoir Area

The right side of the reservoir is wooded with homes along the shore, most of which are about 20 feet higher than the shoreline. A portion of the left side of the reservoir is a picnic area. All the land surrounding the reservoir is steeply sloping up from the reservoir, at grades of approximately 30 to 40 percent.

e. Downstream Channel

At the end of the discharge channel, a culvert crosses under a public roadway. Beyond the roadway, the downstream channel consists of a narrow pond with homesites located along both shores.

Approximately 1500 feet from the dam another public road crosses the channel. Downstream from the road, the channel continues as a natural stream with low banks and a flood plain about 100 feet wide.

SECTION 4: OPERATIONAL PROCEDURES

4.1 Procedures

The level of water in Cooks Pond is regulated by discharge over the stoplogs of the spillway and through the discharge culverts. The lake reportedly is partially lowered each year by removing stoplogs. At the time of inspection on December 19, 1980, the lake level was below the top of the stoplogs, whereas on March 12, 1981, the lake level was equal to the top of the stoplogs.

The stoplogs reportedly are not removed at times of storms to augment spillway capacity.

4.2 Maintenance of the Dam

Reportedly, maintenance of the dam is performed on an "as needed" basis.

4.3 Maintenance of Operating Facilities

Reportedly, maintenance of operating facilities is performed on an "as needed" basis.

4.4 Description of Warning System

Reportedly, no warning system is currently in use for the dam.

4.5 Evaluation of Operational Adequacy

The operation of the dam has been successful to the extent that the dam reportedly has not been overtopped.

Maintenance documentation is poor and maintenance has not been adequate in the following areas.

1) Trees on the embankment not removed.
2) Debris in the spillway chamber and discharge culvert not removed.
3) Deteriorated stoplogs not replaced.
4) Sloughing of downstream side of dam in vicinity of spillway not repaired.
5) Eroded area on downstream side of embankment not filled and stabilized.
6) Deteriorated riprap along upstream side of embankment not renovated.
7) Worn areas of embankment crest not stabilized.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 Evaluation of Features

a. Design Data

The quantity of storm water runoff that the spillway should be able to handle is based on the size and hazard classification of the dam. This runoff quantity, called the spillway design flood (SDF), is described in terms of return frequency or probable maximum flood (PMF) depending on the extent of the dam's size and potential hazard. According to the "Recommended Guidelines for Safety Inspection of Dams" published by the U.S. Army Corps of Engineers, the SDF for Cooks Pond Dam falls in a range of 100-year frequency to 1/2 PMF. In this case, the low end of the range, 100-year frequency, is chosen since the factors used to select size and hazard classification are on the low side of their respective ranges.

The SDF peak computed for Cooks Pond Dam is 175 c.f.s. This value is derived from the 100-year flood hydrograph computed by the use of the HEC-1-DAM Flood Hydrograph Computer Program using the Soil Conservation Service triangular unit hydrograph with curvilinear transformation. Hydrologic computations and computer output are contained in Appendix 4.

The spillway discharge rates were computed by the use of weir and orifice formulae appropriate for the configuration of the spillway as well as culvert capacity charts assuming inlet control. The total spillway discharge with lake level equal to the top of the dam was computed to be 44 c.f.s. The SDF was routed through the dam by use of the HEC-1-DAM computer program using the modified Puls Method. In routing the SDF, it was found that the dam crest would not be overtopped with 1.1 feet of freeboard remaining in a non-breach situation.

Accordingly, the subject spillway is assessed being adequate in accordance with criteria developed by the U.S. Army Corps of Engineers.

b. Experience Data

Reportedly, the dam has never been overtopped. No damage to downstream structures has been reported.

c. Visual Observation

No evidence of overtopping of the embankment was noted at the times of inspection.

d. Overtopping Potential

According to the hydrologic and hydraulic analyses, a storm of intensity equivalent to the SDF will pass through the spillway without an overtopping of the dam and with a minimum freeboard of 1.1 feet.

e. Drawdown Data

Drawdown of the lake is accomplished by removing stoplogs in the spillway structure. Total time for drawdown is estimated to be 1.5 days. (See Appendix 4.)

SECTION 6: STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

Seepage was observed in the discharge channel. Also, voids in the soil behind the boulders at the downstream end of the spillway discharge culvert were observed. The observed seepage and soil voids however, did not appear to be an indication of immediate structural instability.

b. Generalized Soils Description

The generalized soils description of the dam site consists of stratified glacial drift deposited by melt water flowing from the Wisconsin glacier. The deposits are composed of sandy silt and gravel, with some silt and clay in depressions, overlying terminal moraines of the last Wisconsin glacial epoch as shown on the Geological Map of New Jersey. The ground moraine overlies a Pre-Cambrian formation (loose Gneiss).

c. Design and Construction Data

Analysis of structural stability and construction data for the embankment are not available.

d. Operating Records

No operating records are available for the dam. The water level of Cooks Pond is not monitored.

e. Post-Construction Changes

No changes to the dam or area around the dam are known to have occurred since the original construction of the dam in or about 1945.

f. Seismic Stability

Cooks Pond Dam is located in Seismic Zone 1 as defined in "Recommended Guidelines for Safety Inspection of Dam" which is a zone of very low seismic activity. Experience indicates that dams in seismic Zone 1 will have adequate stability under seismic loading conditions if they have adequate stability under static loading conditions. Cooks Pond Dam appeared to be generally stable under static loading conditions at the times of inspection.

SECTION 7: ASSESSMENT AND RECOMMENDATIONS

7.1 Dam Assessment

a. Safety

Based on hydraulic and hydrologic analyses outlined in Section 5 and Appendix 4, the spillway of Cooks Pond Dam is assessed as being adequate. The spillway is able to pass the SDF without an overtopping of the dam.

The embankment appeared, at the time of inspection, to be generally stable. However, evidence of possible distress was observed. The evidence consisted of seepage and soil voids on the downstream side.

b. Adequacy of Information

Information sources for this report include 1) field inspections, 2) USGS quadrangle, 3) consultation with Mr. Frank Petrozzo the owner of the dam. The information obtained is sufficient to allow a Phase I assessment as outlined in "Recommended Guidelines for Safety Inspection of Dams."

Some of the absent data are as follows:

1. Construction and as-built drawings.
2. Description of fill material for embankment.
3. Design computations and reports.
4. Maintenance documentation.
5. Soils report for the site.
6. Post construction engineering reports.

c. Necessity for Additional Data/Evaluation

Although some data pertaining to Cooks Pond Dam are not available, additional data are not considered imperative for this Phase I evaluation.

7.2 Recommendations

a. Remedial Measures

Based on hydraulic and hydrologic analyses outlined in paragraph 5.1.a, the spillway is considered to be adequate.

It is recommended that the following remedial measures be undertaken by the owner in the future.

1) The spillway discharge chamber and discharge channel should be cleaned of debris.

2) Soil on the downstream side of the embankment should be properly graded, compacted and stabilized.

3) Trees and adverse vegetation on the embankment should be removed.

4) Deteriorated stoplogs should be replaced.

5) Riprap on the upstream side of dam should be renovated.

6) The crest of dam should be properly stabilized.

b. Maintenance

In the future, the owner of the dam should develop written operating procedures and a periodic maintenance plan to ensure the safety of the dam.

c. Additional Studies

The observed seepage should be monitored on a periodic basis by a professional engineer experienced in the design and construction of dams in order to detect any changes in condition.

PLATES

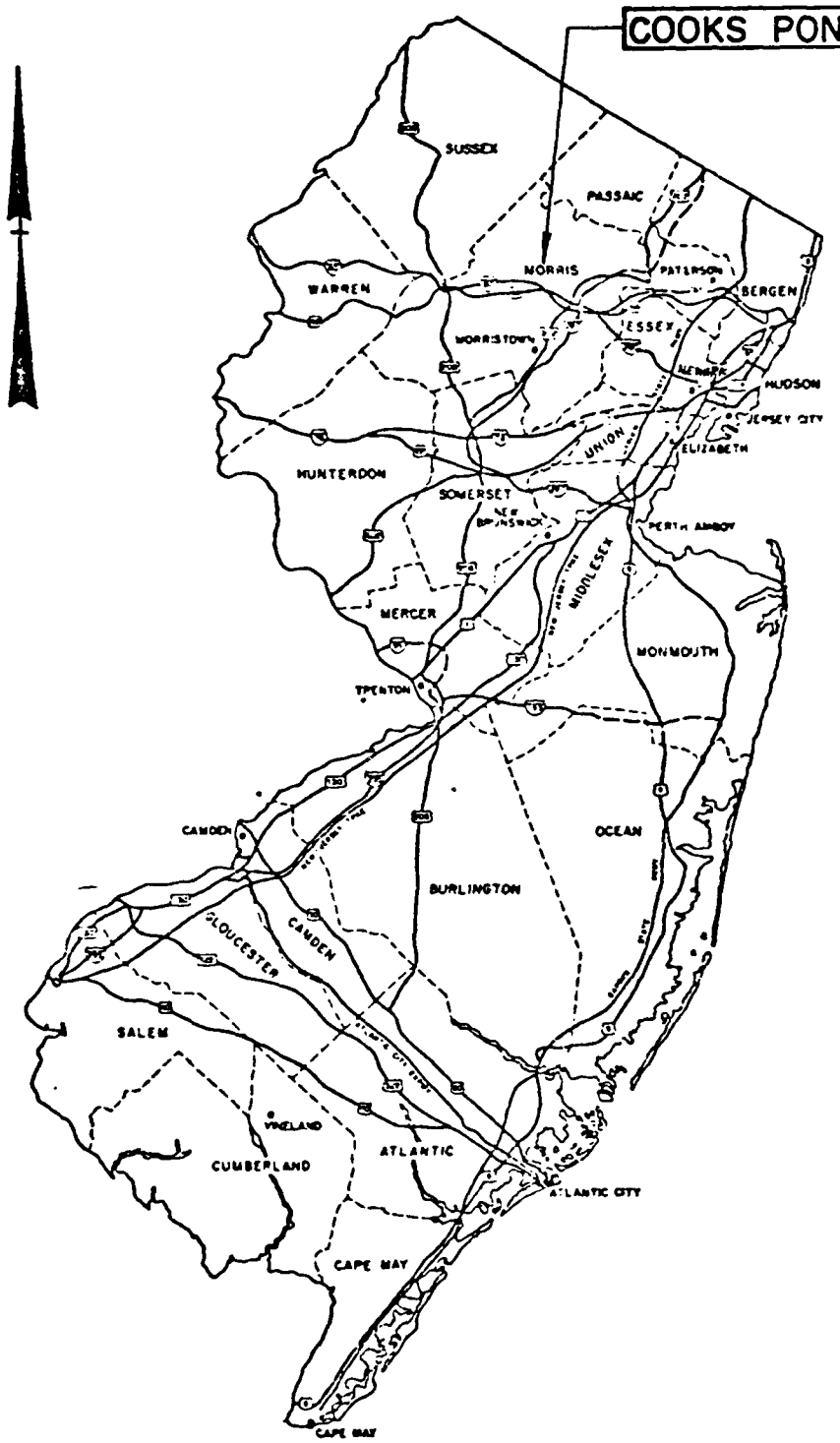


PLATE 1

STORCH ENGINEERS FLORHAM PARK, NEW JERSEY	INSPECTION AND EVALUATION OF DAMS KEY MAP COOKS POND DAM
DIVISION OF WATER RESOURCES N.J. DEPT. OF ENVIR. PROTECTION TRENTON, NEW JERSEY	SCALE: NONE DATE: FEB. 1981

PLATE 2

STORCH ENGINEERS
FLORHAM PARK, NEW JERSEY

DIVISION OF WATER RESOURCES
N.J. DEPT. OF ENVIR. PROTECTION
TRENTON, NEW JERSEY

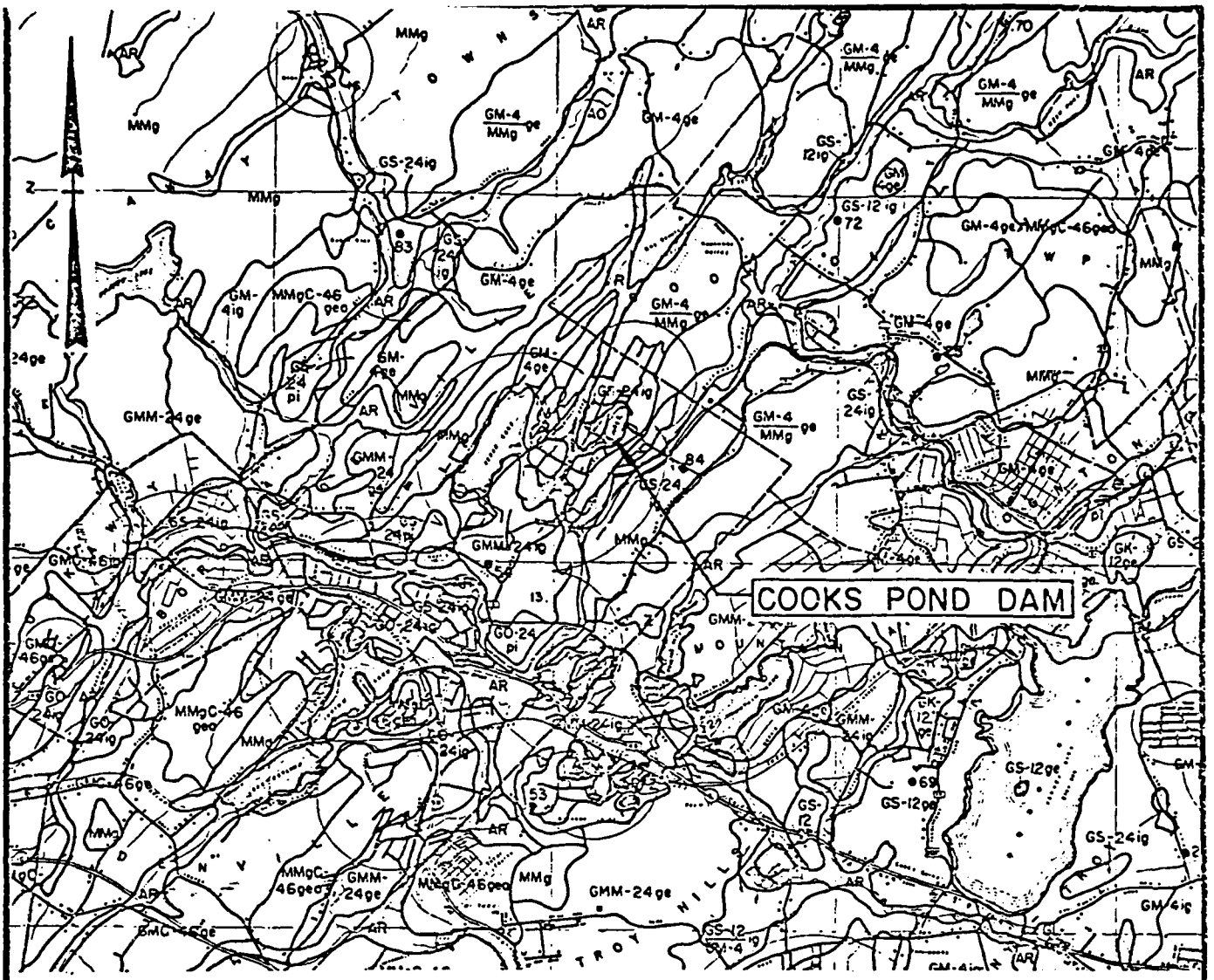
INSPECTION AND EVALUATION OF DAMS

VICINITY MAP

COOKS POND DAM

SCALE: AS SHOWN

DATE: FEB. 1981



Legend

GS-24 Silt, sandy silt, silty sand, gravelly sand, sandy gravel, gravel, and some clayey sand and gravel, overlying a terminal moraine of the Wisconsin glacial epoch.

Note: Information taken from: Rutgers University Engineering Soil Survey of New Jersey, Report No. 9, Morris County, November 1953 and Geologic Map of New Jersey prepared by J. V. Lewis and H. Kummel 1910-1912, revised by H. B. Kummel 1931 and M. Johnson 1950.

PLATE 3

STORCH ENGINEERS
FLORHAM PARK, NEW JERSEY.

DIVISION OF WATER RESOURCES
N.J. DEPT. OF ENVIR. PROTECTION
TRENTON, NEW JERSEY.

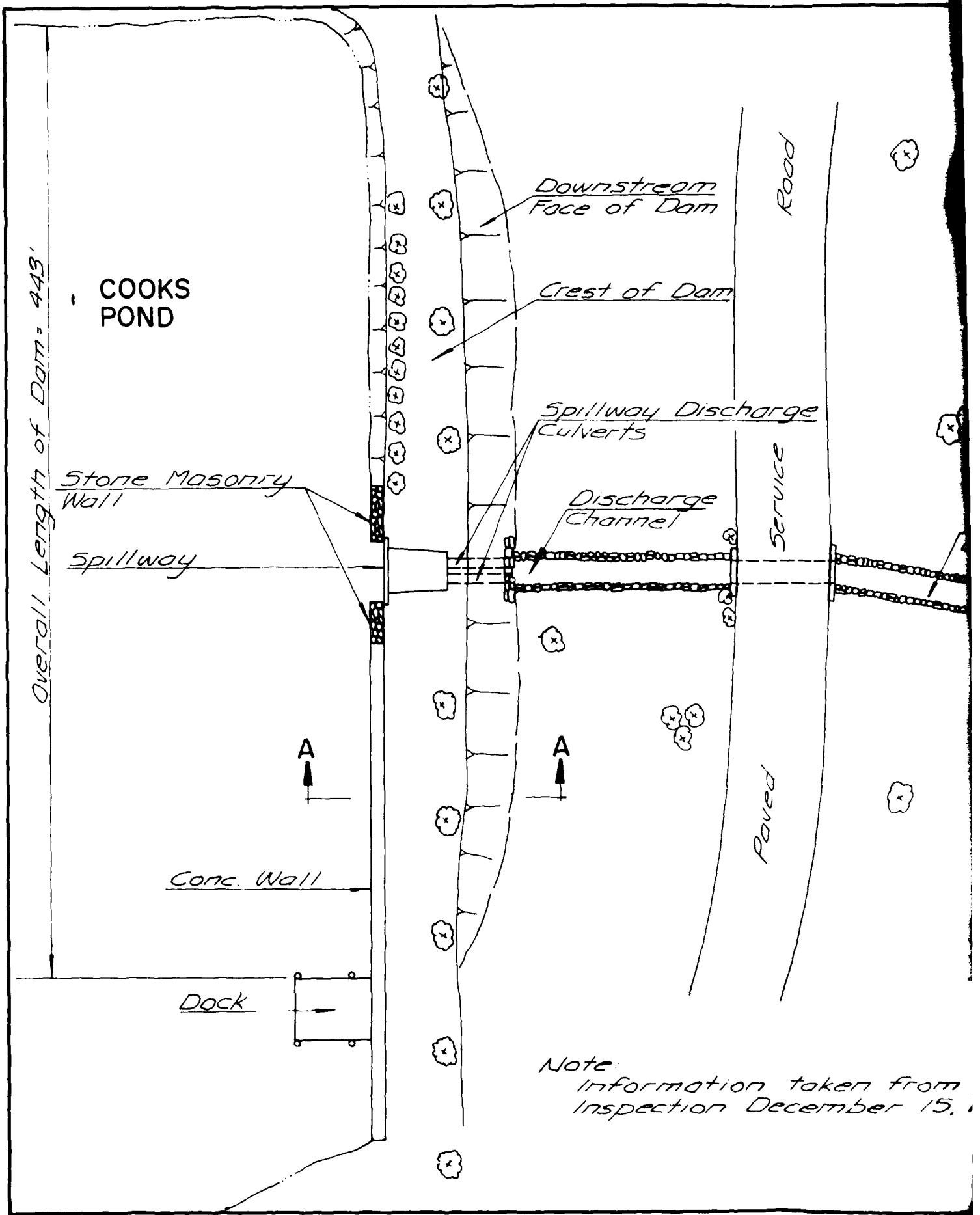
INSPECTION AND EVALUATION OF DAMS

SOIL MAP

COOKS POND DAM

SCALE: NONE

DATE: FEB. 1981


COOKS
POND
Overall Length of Dam = 443'
Downstream
Face of Dam
Crest of Dam
Road
Spillway Discharge
Culverts
Stone Masonry
Wall
Spillway
Discharge
Channel
Service
A
A
Conc. Wall
Dock
Paved
Note:
Information taken from
Inspection December 15,

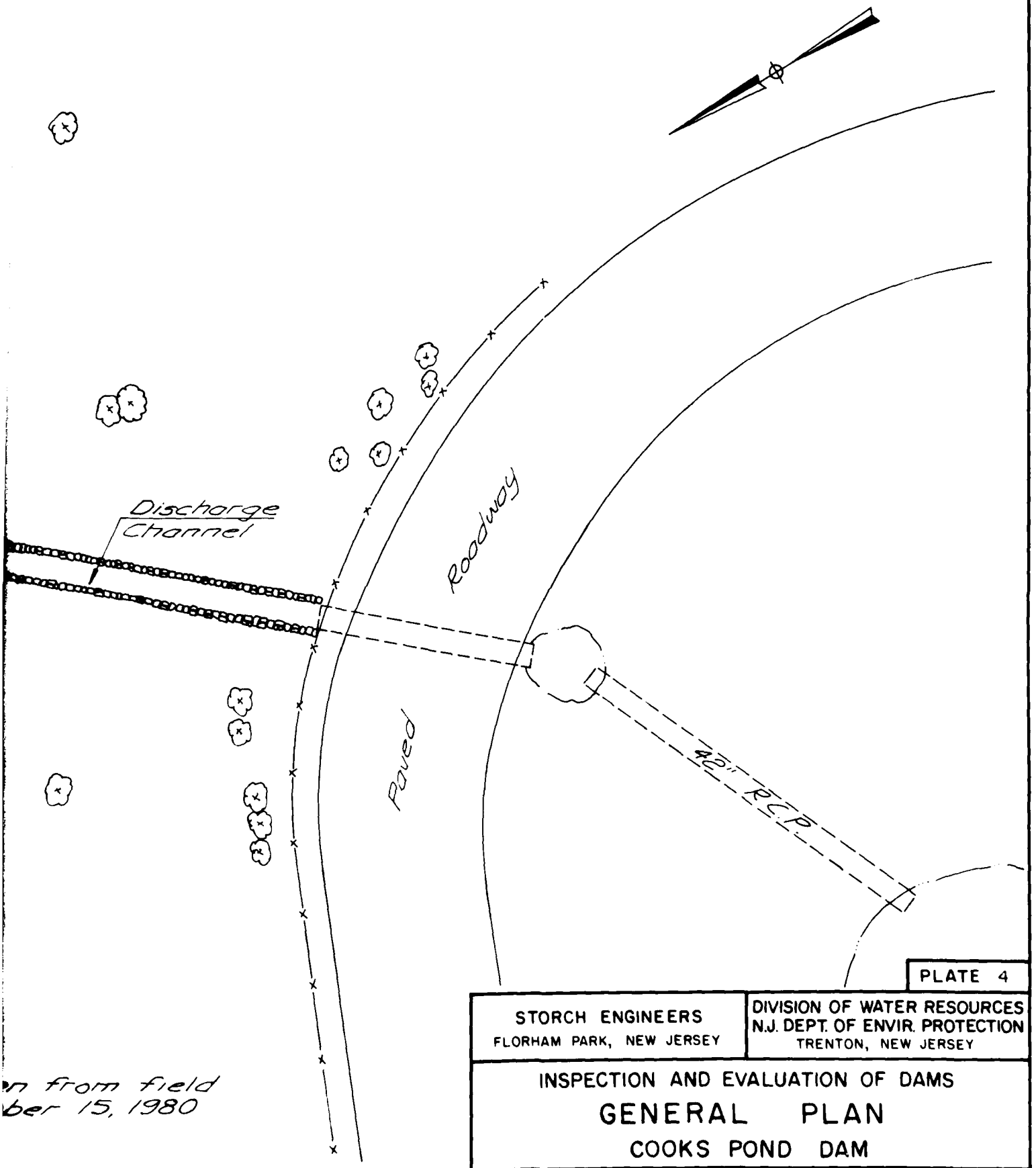


PLATE 4

STORCH ENGINEERS FLORHAM PARK, NEW JERSEY	DIVISION OF WATER RESOURCES N.J. DEPT. OF ENVIR. PROTECTION TRENTON, NEW JERSEY

INSPECTION AND EVALUATION OF DAMS

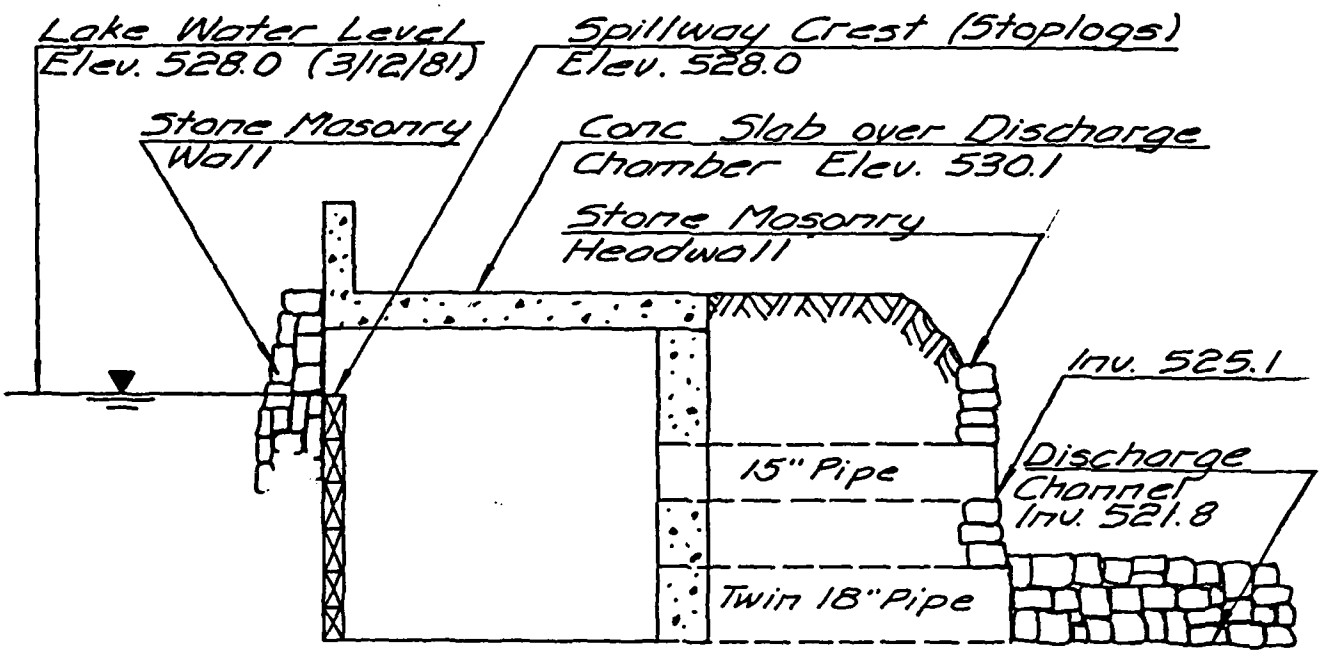
GENERAL PLAN

COOKS POND DAM

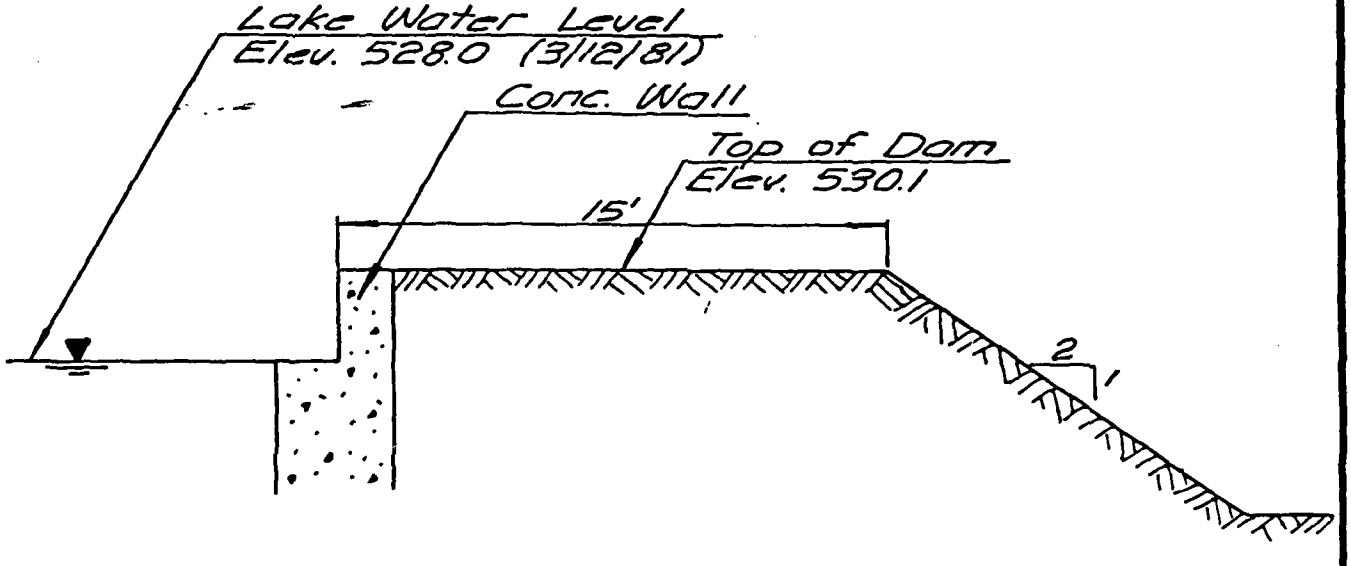
I.D. NJ 00810	SCALE: NOT TO SCALE
	DATE: APRIL, 1981

n from field
ber 15, 1980

2



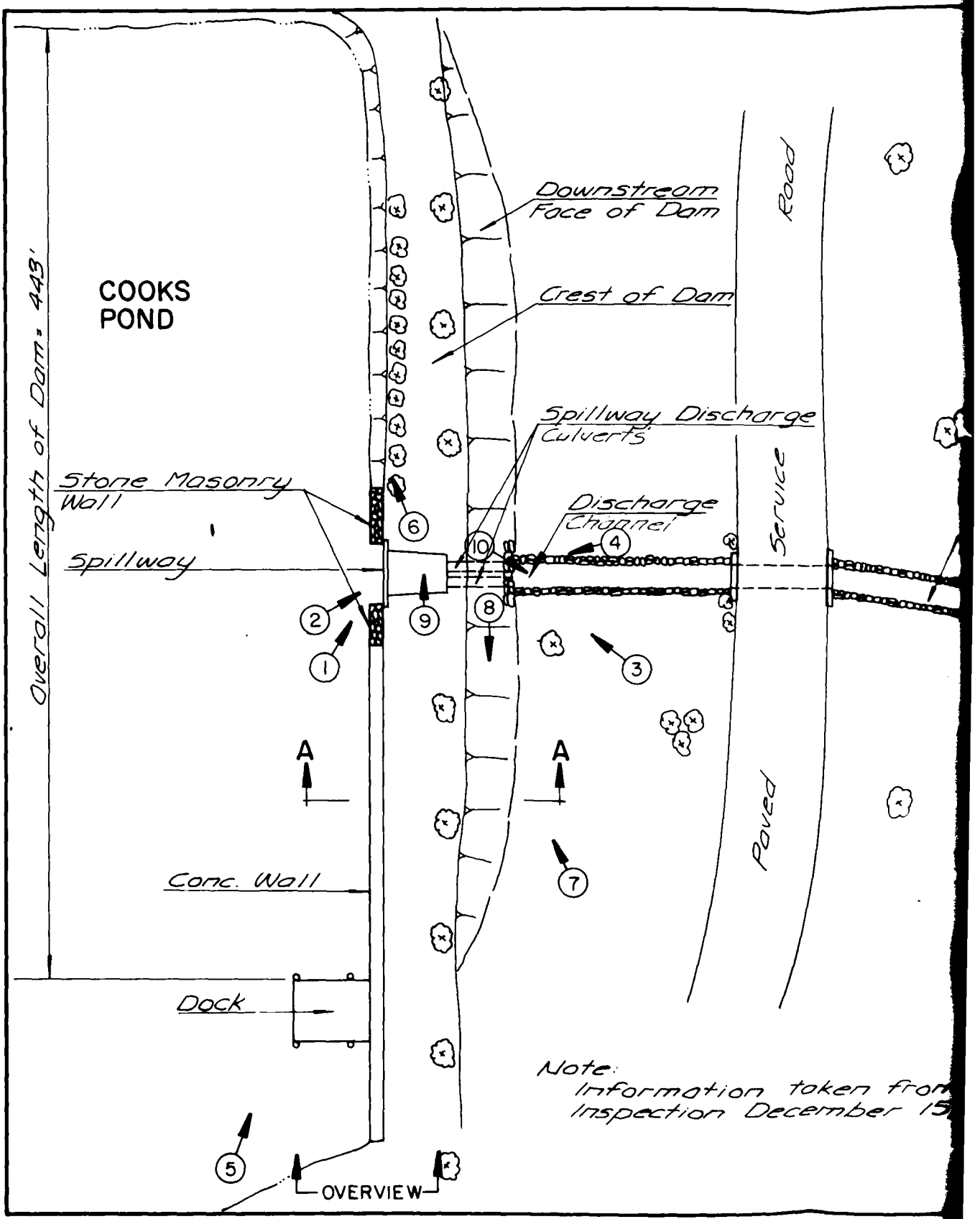
SPILLWAY SECTION



SECTION A-A

PLATE 5

STORCH ENGINEERS FLORHAM PARK, NEW JERSEY	INSPECTION AND EVALUATION OF DAMS SECTIONS COOKS POND DAM
DIVISION OF WATER RESOURCES N.J. DEPT. OF ENVIR. PROTECTION TRENTON, NEW JERSEY	I.D. N.J. 00810 / SCALE: NONE DATE: APRIL 1981


COOKS
POND
Overall Length of Dam = 443'
Downstream
Face of Dam
Crest of Dam
Spillway Discharge
Culverts
Stone Masonry
Wall
Spillway
Discharge
Channel
Service
Road
Paved
Conc. Wall
Dock
A
A
1
2
3
4
5
6
7
8
9
10
OVERVIEW
Note:
Information token from
Inspection December 15

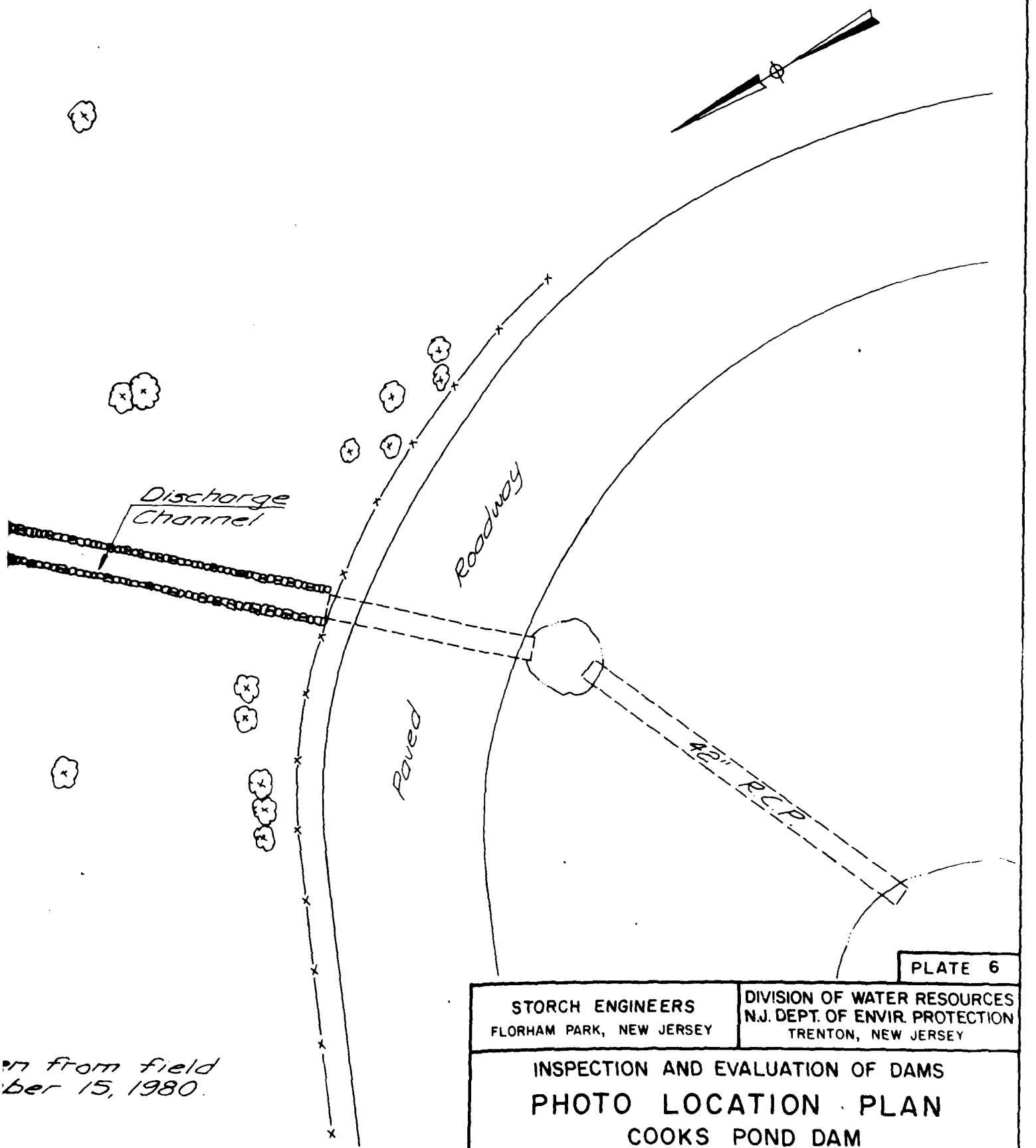


PLATE 6

STORCH ENGINEERS FLORHAM PARK, NEW JERSEY	DIVISION OF WATER RESOURCES N.J. DEPT. OF ENVIR. PROTECTION TRENTON, NEW JERSEY

INSPECTION AND EVALUATION OF DAMS

PHOTO LOCATION PLAN

COOKS POND DAM

I.D. N.J. 00810	SCALE: NOT TO SCALE
	DATE: APRIL, 1981

rn from field
ber 15, 1980.

APPENDIX 1

- Check List - Visual Inspection
- Check List - Engineering Data

Check List

Visual Inspection

Phase I

Name of Dam Cooks Pond Dam County Morris State N. J. Coordinators NJDEP

Date(s) Inspection 12/15/80, 3/12/81 Weather Cloudy Temperature 20°F.

Pool Elevation at time of Inspection 528.0 M.S.L. Tailwater at Time of Inspection 520.6 M.S.L.

Inspection Personnel:

John Gribbin Alex Nau

Charles Osterkorn Richard McDermott

Daniel Buckelew

John Gribbin Recorder

EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
GENERAL	Crest covered with sparce grass, pedestrian path located along center. Trees (2" to 12") located on upstream and downstream sides. Concrete and stone masonry wall on upstream side in fair condition.	Trees should be removed. Crest should b stabilized.
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	Generally sound. 1 foot wide gap between upstream wall and right side of spillway structure crudely filled with stones and mortar.	Gap between upstream wall and right side of spillway should be renovated.
ANY NOTICEABLE SEEPAGE	Evidence of seepage observed in concrete lined spillway discharge channel. Flow in channel 50' from dam greater than flow at dam. Also, orange colored deposits observed in flow 50' from dam. Difference in flow quantites could indicate seepage entering channel.	Seepage should be monitored.
STAFF GAGE AND RECORDER	None observed.	
DRAINS	None observed.	

EMBANKMENT

VISUAL EXAMINATION	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	Soil voids observed on downstream side. (See description below.)	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None observed.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	Boulders, haphazardly placed, observed on downstream side in vicinity of spillway. Voids observed in soil behind boulders. Sloughing of embankment soil observed in area of voids. Area of erosion observed on downstream side about 50' left of spillway appeared to be caused by pedestrian traffic and runoff.	Soil should be graded, compacted and stabilized.
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	Vertical: generally level. Horizontal: generally straight, slightly irregular.	
RIPRAP	Riprap was observed along upstream side, left of spillway. Stones approx. 12" average size. Riprap generally deteriorated.	Riprap should be renovated.

OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SURFACES IN OUTLET CONDUIT	Same as spillway	
INTAKE STRUCTURE	Timber stoplogs; same as spillway weir.	
OUTLET STRUCTURE	Same as spillway	
OUTLET CHANNEL	Same as spillway	
GATE AND GATE HOUSING	Timber stoplogs; same as spillway weir.	

SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
WEIR	Weir formed by timber stoplogs in deteriorated condition.	Stoplogs should be replaced.
DISCHARGE CHAMBER	Concrete surfaces generally satisfactory. Vertical crack 1/8" wide observed on downstream wall of chamber. Interior of chamber contained significant accumulation of debris.	Debris should be removed.
DISCHARGE CULVERTS	Two 18-inch culverts with inverts at bottom of chamber appeared to have no reinforcing. One 15-inch culvert with invert above low level pipes appeared to be reinforced. Downstream ends of culverts stabilized by stone masonry headwall in satisfactory condition.	
DISCHARGE CHANNEL	Rectangular section concrete channel was generally obscured by leaves and debris. Right lower culvert was discharging with a trickle into the channel.	Debris should be removed.

INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	None observed.	
OBSERVATION WELLS	None observed.	
WEIRS	None observed.	
PIEZOMETERS	None observed.	
OTHER	N. A.	

RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	Shores generally steeply sloping at grades of approx. 30% to 40%.	
SEDIMENTATION	Unknown.	
STRUCTURES ALONG BANKS	Right side of reservoir wooded with homesites along shore Dwellings about 20' above water level. Portion of left side consists of picnic area.	

DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTION, DEBRIS, ETC.)	Downstream from discharge channel a culvert crossed under a public road. Then channel consists of narrow pond as far as 1500' from dam, where another public road is located. Then channel consists of natural stream with low banks and flood plain about 100' wide.	
SLOPES	Banks generally moderate to steep along narrow pond. Slopes of channel downstream from pond are generally moderate to steep beyond flat flood plain.	
STRUCTURES ALONG BANKS	Homesites located along both sides of narrow pond. Two dwellings and ambulance building located 3500' downstream. Public roads cross channel 150', 1500' and 3500' from dam.	

CHECK LIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION

ITEM			REMARKS
DAM	-	PLAN	Not available.
		SECTIONS	
SPILLWAY	-	PLAN	Not available.
		SECTIONS	
		DETAILS	
OPERATING EQUIPMENT PLANS & DETAILS			Not available.
OUTLETS	-	PLAN	Not available.
		DETAILS	
		CONSTRAINTS	
		DISCHARGE RATINGS	
HYDRAULIC/HYDROLOGIC DATA			Not available.
RAINFALL/RESERVOIR RECORDS			Not available.
CONSTRUCTION HISTORY			Not available.
LOCATION MAP			Not available.

ITEM	REMARKS
DESIGN REPORTS	Not available.
GEOLOGY REPORTS	Not available.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM INSTABILITY SEEPAGE STUDIES	Not available.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	Not available.
POST-CONSTRUCTION SURVEYS OF DAM	Not available.
BORROW SOURCES	Not available.

ITEM	REMARKS
MONITORING SYSTEMS	Not available.
MODIFICATIONS	Not available
HIGH POOL RECORDS	Not available.
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	Not available.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	Not available.
MAINTENANCE OPERATION RECORDS	Not available.

APPENDIX 2

Photographs

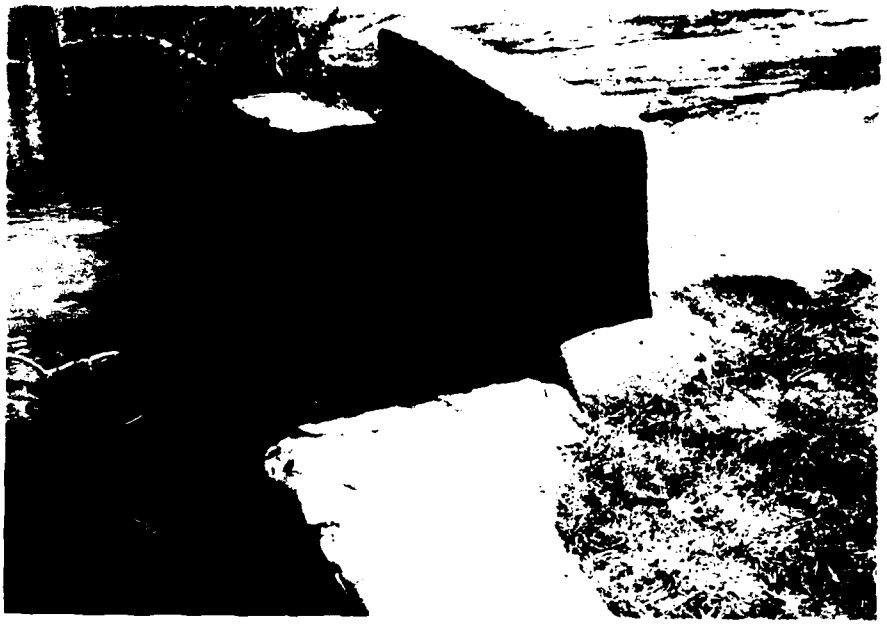


PHOTO 1
UPSTREAM END OF SPILLWAY

PHOTO 2
CREST OF SPILLWAY - TIMBER STOPLOGS

COOKS POND DAM
12 MARCH 1981

PHOTO 3
DOWNSTREAM SIDE OF DAM IN VICINITY OF SPILLWAY

PHOTO 4
DOWNSTREAM END OF SPILLWAY DISCHARGE CULVERTS

COOKS POND DAM
12 MARCH 1981

PHOTO 3
DOWNSTREAM SIDE OF DAM IN VICINITY OF SPILLWAY

PHOTO 4
DOWNSTREAM END OF SPILLWAY DISCHARGE CULVERTS

COOKS POND DAM
12 MARCH 1981

PHOTO 5
CONCRETE WALL ALONG UPSTREAM SIDE OF DAM -
RIGHT OF SPILLWAY

PHOTO 6
EROSION ON UPSTREAM SIDE OF DAM -
LEFT OF SPILLWAY

COOKS POND DAM
12 MARCH 1981

PHOTO 7
DOWNSTREAM SIDE OF DAM

PHOTO 8
SOIL VOID ON DOWNSTREAM SIDE OF DAM NEAR SPILLWAY

COOKS POND DAM
12 MARCH 1981

PHOTO 9
CREST OF DAM SHOWING TOP OF SPILLWAY DISCHARGE CHAMBER

PHOTO 10
SPILLWAY DISCHARGE CHANNEL

COOKS POND DAM
12 MARCH 1981

APPENDIX 3

Engineering Data

CHECK LIST

HYDROLOGIC AND HYDRAULIC DATA

ENGINEERING DATA

DRAINAGE AREA CHARACTERISTICS: Suburban residential

ELEVATION TOP NORMAL POOL (STORAGE CAPACITY): 528.0 (59 acre-feet)

ELEVATION TOP FLOOD CONTROL POOL (STORAGE CAPACITY): N.A.

ELEVATION MAXIMUM DESIGN POOL: 530.1

ELEVATION TOP DAM: 530.1

SPILLWAY CREST: Stoplogs in concrete intake structure

a. Elevation 528.0

b. Type Sharp crested weir

c. Width 0.2 foot

d. Length 5.0 feet

e. Location Spillover Upstream side of dam

f. Number and Type of Gates One set of stoplogs

OUTLET WORKS: Included in spillway structure

a. Type Timber stoplogs

b. Location Upstream end of spillway structure

c. Entrance Invert 521.8

d. Exit Invert 521.8

e. Emergency Draindown Facilities: Remove stoplogs

HYDOMETEOROLOGICAL GAGES: None

a. Type N.A.

b. Location N.A.

c. Records N.A.

MAXIMUM NON-DAMAGING DISCHARGE:

(Lake Stage Equal to Top of Dam) 44 c.f.s.

APPENDIX 4

Hydraulic/Hydrologic Computations

STORCH ENGINEERS

Sheet 1 of 15

Project Cooks Pond Dam

Made By JLP Date 3-9-81

Chkd By JG Date 3/31/81

HYDROLOGY

HYDROLOGIC ANALYSIS - RUNOFF HYDROGRAPH WILL BE DEVELOPED BY THE HEC-1-DAM COMPUTER PROGRAM USING THE SCS TRIANGULAR HYDROGRAPH WITH CURVILINEAR TRANSFORMATION.

DRAINAGE AREA = 0.14 SQ. MI.

INFILTRATION DATA

INITIAL INFILTRATION = 1.5 inches

CONSTANT INFILTRATION 0.15 inches/hour

TIME OF CONCENTRATION

1) SCS TR55

OVERLAND FLOW $L = 3900'$

$V = 0.56$ F.P.S. $S = 5.13\%$

$T_c =$ 1.93 HR.

2) BY KERBY HANDBOOK OF HYDROLOGY BY CHOW

$$T_c = \frac{2.14\ 2/3\ Ln}{\sqrt{S}}$$

where: T_c = Overland time of concentration
L = length of overland flow
n = Mannings Coeff.

TIME OF CONCENTRATION (con't.)

2) Overland Flow

$L = 3900$
$S = 0.0513$
$n = 0.40$
$T_c =$ 0.86 Hr.

3) Design of Small Dams pg. 71

$$T_c = \left(\frac{11.9\,L^3}{H}\right)^{0.385}$$

T_c = time of concentration
L = length of watercourse
H = elevation difference

Overland Flow:

$L = 3900'$
$H = 200'$
$T_c =$ 0.24 Hour

4) N.J. Highway Authority Nomograph

Overland Flow:

$L = 3900'$
$S = 5.33\%$
Average Grass
$T_c =$ 0.78 Hour

TIME OF CONCENTRATION (con't)

5) TEXAS HIGHWAY DEPT. "DESIGN OF SMALL DAMS" U.S. DEPT. OF INTERIOR

Overland Flow: L = 3900' S = 51.3%

V = 2.0 F.P.S.

T_c = 0.54 Hour

FOR COMPUTER INPUT

use T_c = 0.60 Hr.

Lag Time = 0.6 T_c = 0.36 Hr.

STORCH ENGINEERS

Project Cooks Pond Dam

Sheet 4 of 15

Made By VLP Date 3-9-81

Chkd By JG Date 3/31/81

SQUARE 4 X 4 TO THE INCH

LAKE STORAGE VOLUME

ELEVATION	AREA (ACRES)
520	0
527	17.45
540	31.22
560	38.11

HEC-1-DAM COMPUTER PROGRAM WILL DEVELOP STORAGE CAPACITY FROM SURFACE AREAS AND ELEVATIONS.

INFORMATION TAKEN FROM USGS QUADRANGLES. BOONTON, N.J.

PRECIPITATION

24 HOUR, 100-YEAR RAINSTORM

DISTRIBUTION FOR COOKS POND DAM

TIME (HOUR)	RAIN (inches)
1	0.075
2	0.075
3	0.075
4	0.075
5	0.075
6	0.075
7	0.075
8	0.075
9	0.075
10	0.075
11	0.075
12	0.075
13	0.15
14	0.15
15	0.15
16	0.33
17	0.65
18	3.00
19	0.65
20	0.33
21	0.33
22	0.15
23	0.15
24	0.15
	7.09 inches

HYDRAULICS

THE SPILLWAY AT COOKS POND DAM CONSISTS OF A SHARP-CRESTED WEIR (STOPLOGS) AT THE ENTRANCE TO AN INLET CHAMBER. THE CHAMBER DISCHARGES THRU TWO 18" AND ONE 15 inch DIAMETER PIPE, DISCHARGE Q, CAN BE CALCULATED BY

$$Q = cLh^{3/2}$$

where:

Q = discharge over spillway
C = discharge coefficient
L = effective length of spillway
h = total head on spillway

Values for the discharge coefficient, "C" were taken from the "Handbook of Hydraulics" by King & Brater.

HYDRAULICS (con't.)

BECAUSE OF THE CONCRETE SLAB ON TOP OF THE CHAMBER, ORIFICE FLOW WILL BE TAKEN INTO ACCOUNT AT THE APPROPRIAT ELEVATION.

Orifice Flow:

$$Q = 0.6\,(A)\sqrt{2gh'}$$

For Water surface elevation over 529.6, Orifice flow will be assumed.

Flow thru the three discharge pipes will be taken from "Hydraulic Charts for the Selection of Highway Culverts."

Spillway stage - discharge curve will be developed by analysis of control of flow at either entrance to chamber or at discharge pipes.

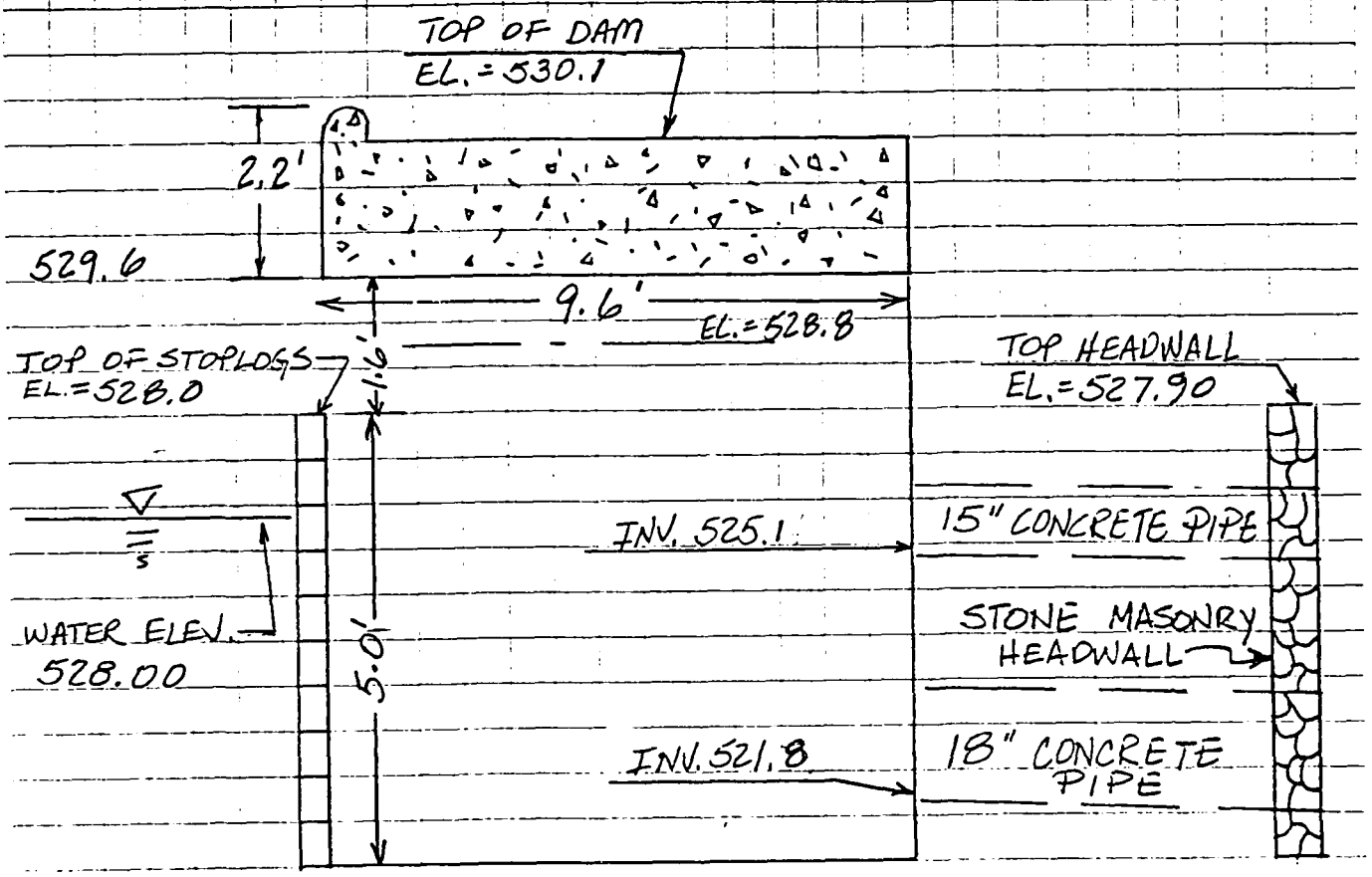
STORCH ENGINEERS

Project COOKS POND DAM

Sheet 8 of 15

Made By JLP Date 3-10-81

Chkd By JG Date 3/31/81



STORCH ENGINEERS

Project COOKS POND DAM Made By JLP Date 3-11-81

Chkd By JG Date 3/31/81

Sheet 9 of 15

SPILLWAY STAGE DISCHARGE TABULATION

	WEIR FLOW				ORIFICE FLOW			Total	18" & 15" CONCRETE PIPES INLET CONTROL, CHART II				Total
ELEV.	C	L	h	Q	A	2g	h	Q	2-18" HW/D	18" Q	1-15" HW/D	15" Q	Q
528.0													
528.5	3.32	5.0	0.5	6.04									
529.0	3.32	5.0	1.0	16.8									
527.6					8.0	64.4	0.8	34.4	5.2	44	3.6	11	55
530.0					8.0	64.4	1.2	42.2	5.5	48	3.9	12	60
530.1					8.0	64.4	1.3	43.9	5.53	48	4.0	13	61
531.0					8.0	64.4	2.2	57.1	6.1	50	4.7	14	64
532.0					8.0	64.4	3.2	68.9	6.8	58	5.5	15	73
533.0					8.0	64.4	4.2	78.9	7.5	60	6.3	17	77
534.0					8.0	64.4	5.2	87.8	8.1	66	7.1	19	85
535.0					8.0	64.4	6.2	95.9	8.8	70	7.9	20	90

STORCH ENGINEERS

Project Cooks Pond Dam

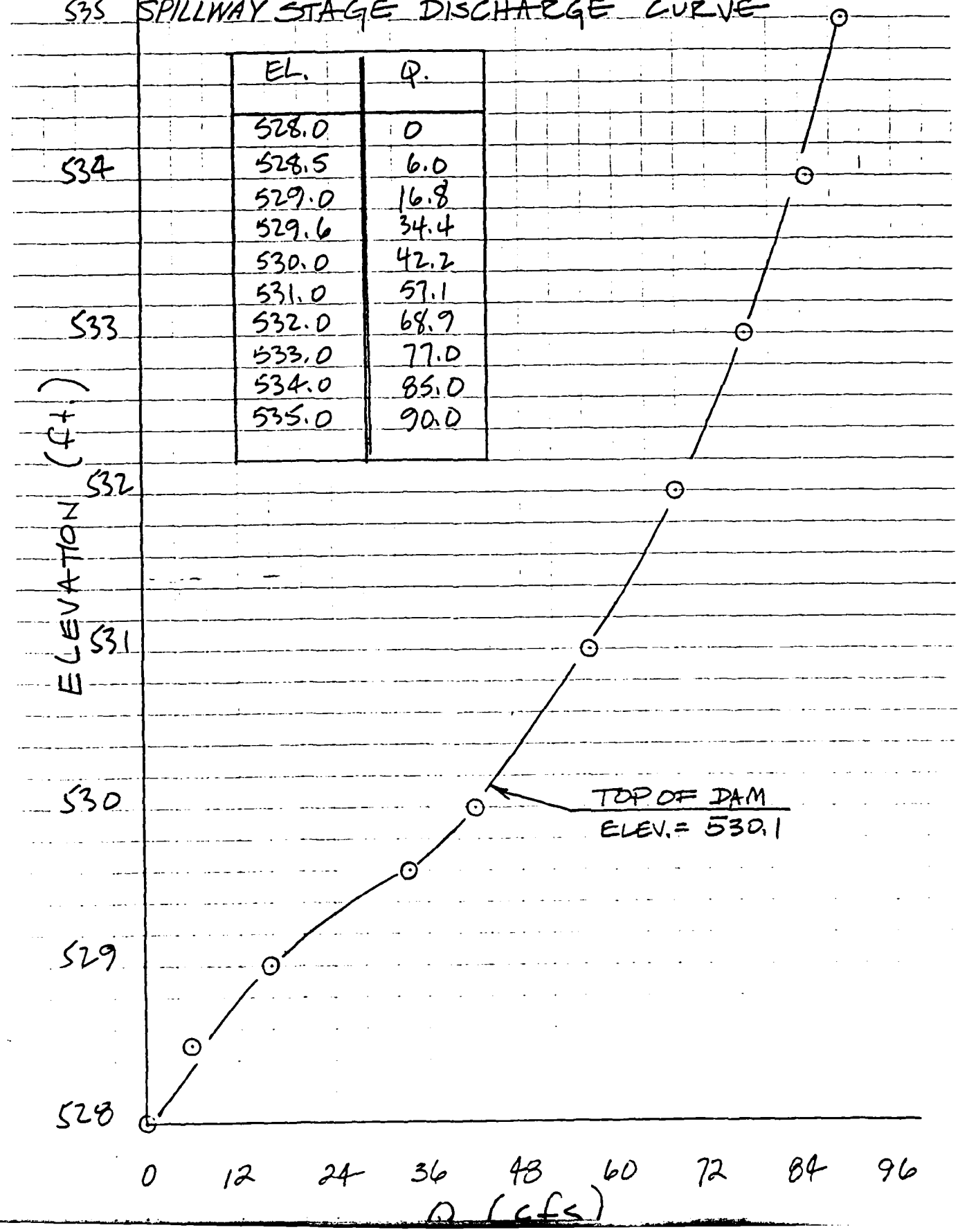
Sheet 10 of 15

Made By JLP Date 3-11-81

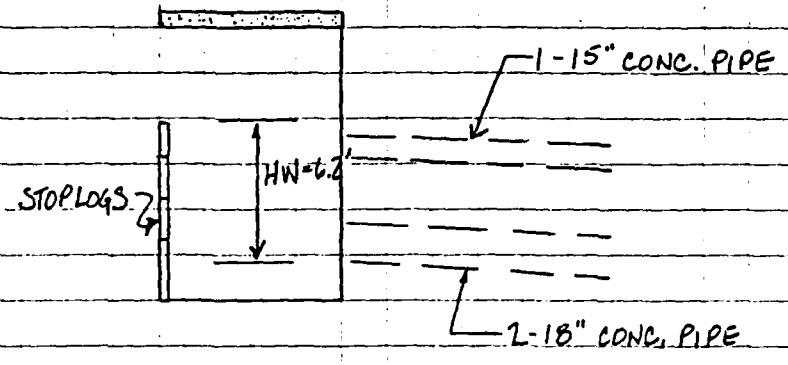
Chkd By JG Date 3/31/81

SPILLWAY STAGE DISCHARGE CURVE

EL.	Q.
528.0	0
528.5	6.0
529.0	16.8
529.6	34.4
530.0	42.2
531.0	57.1
532.0	68.9
533.0	77.0
534.0	85.0
535.0	90.0



DRAWDOWN CAPACITY



Discharge based on culvert capacity charts.

- Maximum discharge, HW = 6.2'

Q = 40 c.f.s.

Average discharge, HW = 3.1'

Q = 20 c.f.s.

Drawdown

$$\text{Drawdown Time} = \frac{\text{Storage at Spillway}}{\text{Avg. Discharge} - \text{Avg. Inflow}}$$

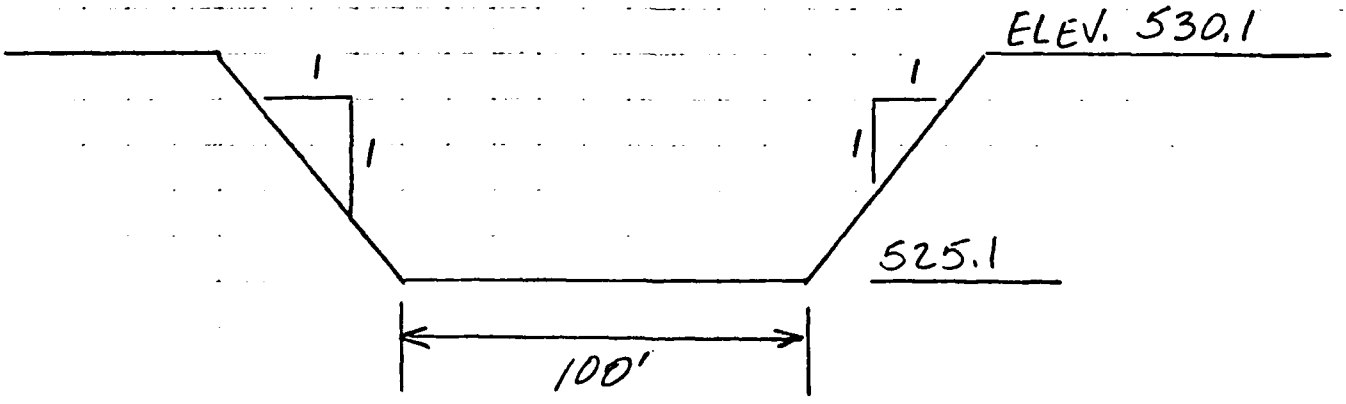
$$= \frac{59 \text{ acre-feet} \times 43560 \text{ sq. ft./acre}}{(20 \text{ cfs} - 0.1 \text{ c.f.s.}) \times 3600 \text{ sec/hr.}}$$

$$= 35.7 \text{ hr} = 1.5 \text{ days}$$

BREACH ANALYSIS

A BREACH HYDROGRAPH WILL BE COMPUTED BY THE HEC-1-DAM PROGRAM AND ROUTED THROUGH TWO DOWNSTREAM REACHES BY THE MODIFIED PULS METHOD. THE ASSUMED BREACH CONDITIONS ARE AS FOLLOWS:

1. THE BREACH BEGINS WHEN THE WATER SURFACE ELEVATION REACHES 528.9.
2. TIME TO DEVELOP BREACH = 1.0 HR.
3. SECTION:



FULLY DEVELOPED BREACH

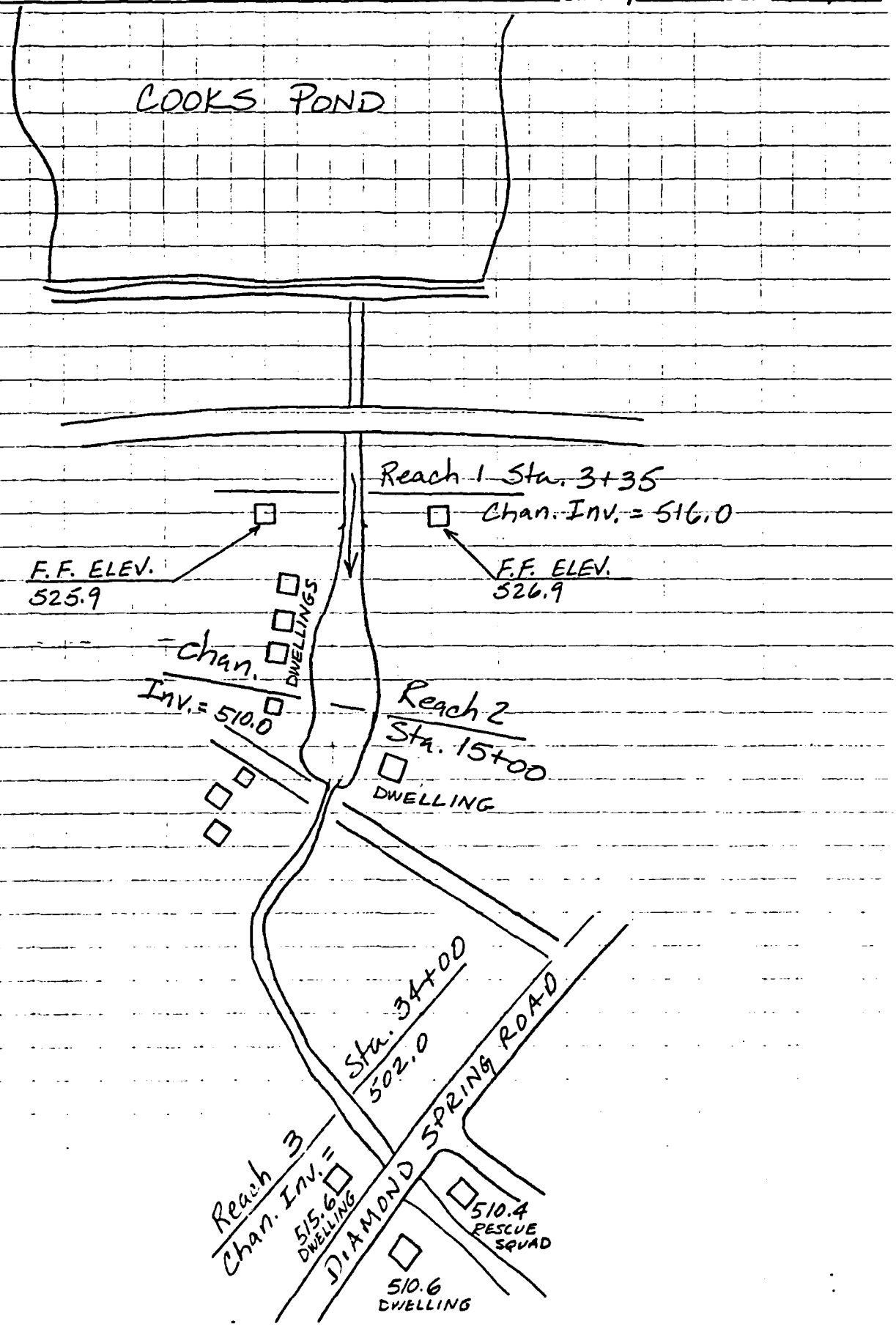
STORCH ENGINEERS

Sheet 13 of 15

Project COOKS POND DAM

Made By JLP Date 3-10-81

Chkd By JG Date 3/31/81



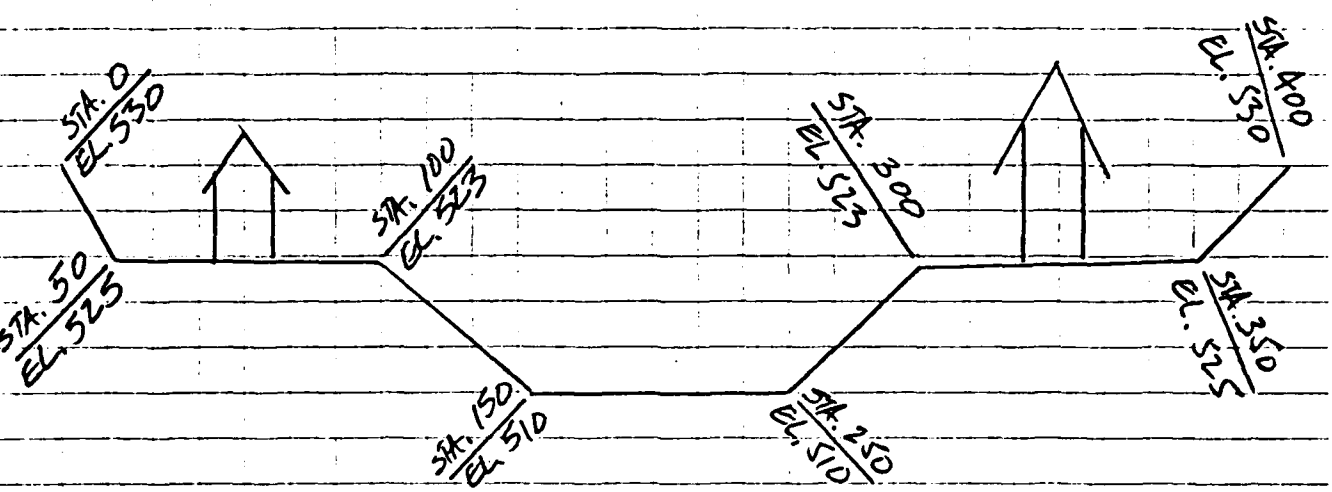
STORCH ENGINEERS

Project Cooks Pond Dam

Sheet 14 of 15

Made By JLP Date 3-12-81

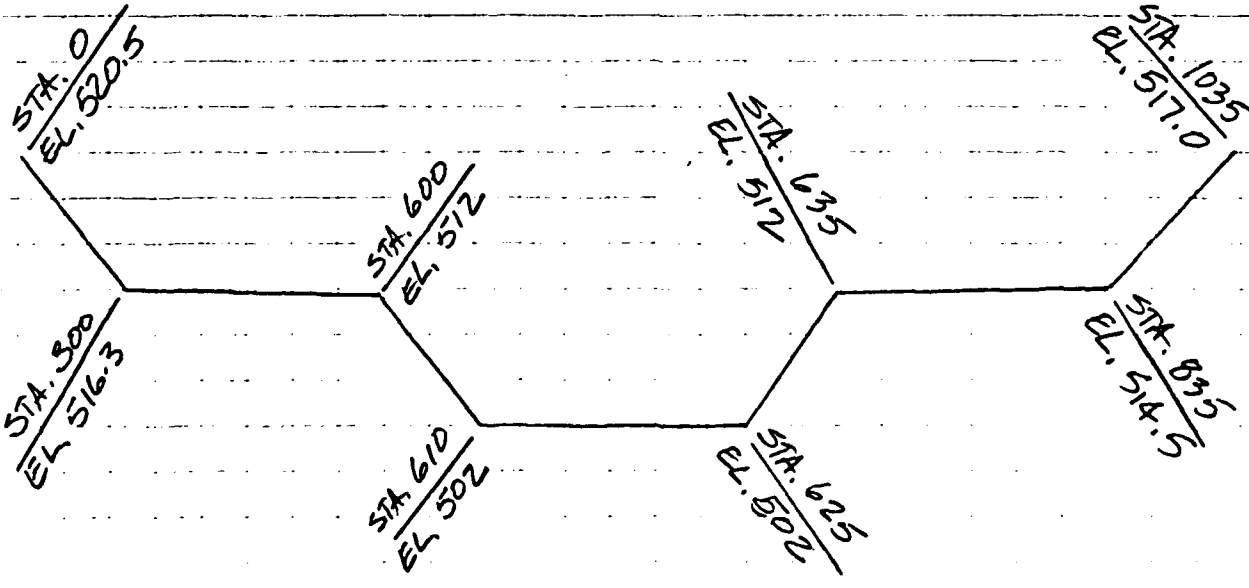
Chkd By JG Date 3/31/81



END OF REACH 2 CROSS SECTION

STA 15+00

(Neglect backwater effect of road embankment)



END OF REACH 3 CROSS SECTION

STA 34+00

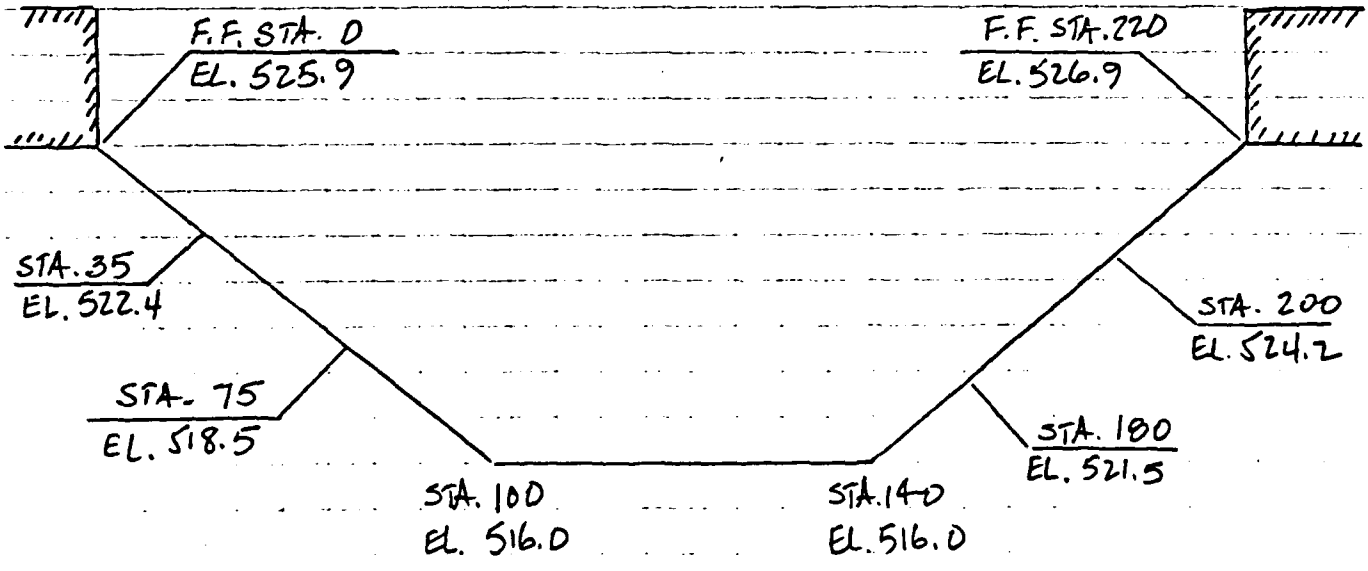
RESULTS OF BREACH:

Peak outflow = 1508 c.f.s.

Reach 1: Max. Stage 518.7
Stream Inv. 516.0
Dwellings not inundated

Reach 2: Max. Stage 512.5
Stream Inv. 510.0
Dwellings not inundated

Reach 3: Max Stage 510.1
Stream Inv. 502.0
Dwellings not inundated



END OF REACH 1 CROSS SECTION

STA 3+35

HEC - 1 - DAM PRINTOUT

Overtopping Analysis

```
1A1                         NATIONAL DAM SAFETY PROGRAM
 A2                         COOKS POND, NEW JERSEY
 A3                         100 YEAR STORM ROUTING
 B    300       0       10                                      0         0         4
 B1     5
 J      1       1        1
 J1     1
 K      0    LAKE                               0         0         1
 K1          INFLOW HYDROGRAPH TO COOKS POND DAM
 M      0       2      0.1                    0.1         0                             1
 O    144
 O10.0125  0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125
 O10.0125  0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125
 O10.0125  0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125
 O10.0125  0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125
 O10.0125  0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125
 O10.0125  0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125
 O10.0125  0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125
 O10.0125  0.0125    0.025    0.025    0.025    0.025    0.025    0.025    0.025    0.025
 O1 0.025   0.025    0.025    0.025    0.025    0.025    0.025    0.025    0.025    0.025
 O1 0.055   0.055    0.055    0.055    0.055    0.055     0.11     0.11     0.11     0.11
 O1  0.11    0.11      0.5      0.5      0.5      0.5      0.5      0.5     0.11     0.11
 O1  0.11    0.11     0.11     0.11    0.055    0.055    0.055    0.055    0.055    0.055
 O1 0.055   0.055    0.055    0.055    0.055    0.055    0.025    0.025    0.025    0.025
 O1 0.025   0.025    0.025    0.025    0.025    0.025    0.025    0.025    0.025    0.025
 O1 0.025   0.025    0.025    0.025
 T                                                        1.5     0.15
 W2          0.36
 X   -1.0   -0.05      2.0
 K      1     DAM
 K1          ROUTE DISCHARGE THRU DAM
 Y                               1         1
 Y1     1                                              -528.0       -1
 Y4 528.0   528.5    529.0    529.6    530.0    531.0    532.0    533.0    534.0    535.0
 Y5     0       6     16.8     34.4     42.2     57.1     68.9     77.0     85.0     90.0
 $A     0   17.45    31.22    38.11
 $E   520     527      540      560
 $$ 528.0
 $D 530.1    2.63      1.5      443
 K      1       1                                                   1
 K1          CHANNEL ROUTING REACH 1
 Y                               1         1
 Y1     1
 Y6   0.1   0.035      0.1    516.0    526.9      335    0.017
 Y7     0   525.9       35    522.4       75    518.5      100    516.0      140    516.0
 Y7   180   521.5      200    524.2      220    526.9
 K      1       2                                                   1
 K1          CHANNEL ROUTING REACH 2
 Y                               1         1
 Y1     1
 Y6   0.1   0.035      0.1    510.0    530.0     1165    0.005
 Y7     0     530       50      525      100      523      150                250      510
 Y7   300     523      350      525      400      530
 K      1       3
 K1          CHANNEL ROUTING REACH 3
 Y                               1         1
 Y1     1
 Y6   0.1   0.035      0.1      502      512     1900    0.004
 Y7     0   520.5      300    516.3      600      512      610      502      625      502
 Y7   635     512      835    514.5     1035      517
 K     99
 A
 A
```

NATIONAL DAM SAFETY PROGRAM
COOKS POND, NEW JERSEY
100 YEAR SIDRM ROUTING

JOB SPECIFICATION

NO	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
300	0	10	0	0	0	0	0	4	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 1 LRTIO= 1

RTIOS= 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

INFLOW HYDROGRAPH TO COOKS POND DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JRPT	INAME	ISTAGE	IAUTO
LAKE	0	0	0.	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
0	2	.10	0.00	.10	0.00	0.000	0	1	0

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.50	.15	0.00	0.00

UNIT HYDROGRAPH DATA
TC= 0.00 LAG= .34

RECESSION DATA
STRTQ= 1.00 QRCSN= .05 RTIOR= 2.00

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
0									SUM	7.11	4.33	2.78	1781.
										(181.)	(110.)	(71.)	(50.43)

HYDROGRAPH ROUTING

ROUTE DISCHARGE THRU DAM

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
DAM	1	0	0	0	0	0	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-528.	-1

STAGE	528.00	528.50	529.00	529.60	530.00	531.00	532.00	533.00	534.00	535.00
FLOW	0.00	6.00	16.80	34.40	42.20	57.10	68.90	77.00	85.00	90.00
SURFACE AREA=	0.	17.	31.	38.						
CAPACITY=	0.	41.	353.	1045.						
ELEVATION=	520.	527.	540.	560.						

CREL	SPWID	COQW	EXPW	ELEVL	COOL	CAREA	EXPL
528.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
530.1	2.6	1.5	443.

PEAK OUTFLOW IS 17. AT TIME 19.67 HOURS

RATIOS APPLIED TO FLOWS

OPERATION	STATION	AREA	PLAN	RATIO 1
				1.00
HYDROGRAPH AT	LAKE	.10	1	175.
		(.26)		(4.94)
ROUTED TO	DAM	.10	1	17.
		(.26)		(.48)
ROUTED TO	1	.10	1	17.
		(.26)		(.48)
ROUTED TO	2	.10	1	17.
		(.26)		(.48)
ROUTED TO	3	.10	1	17.
		(.26)		(.48)

1 SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	528.00	528.00	530.10
STORAGE	59.	59.	99.
OUTFLOW	0.	0.	44.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX. OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	529.00	0.00	72.	17.	0.00	19.67	0.00

PLAN 1 STATION 1

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
1.00	17.	516.1	19.67

PLAN 1 STATION 2

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
1.00	17.	510.1	19.83

PLAN 1 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
1.00	17.	502.6	20.00

HEC - 1 - DAM PRINTOUT

Breach Analysis

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1A1                            NATIONAL DAM SAFETY PROGRAM
 A2                            COOKS POND, NEW JERSEY
 A3                            100 YEAR STORM ROUTING
 B     300         0        10                                  0         0         4
 B1      5
 J       1         1         1
 J1      1
 K       0      LAKE                           0         0         1
 K1             INFLOW HYDROGRAPH TO COOKS POND DAM
 M       0         2       0.1                0.1        0                            1
 O     144
 O10.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125
 O10.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125
 O10.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125
 O10.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125
 O10.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    (.0125    0.0125
 O10.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125
 O10.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125    0.0125
 O10.0125    0.0125     0.025     0.025     0.025     0.025     0.025     0.025     0.025     0.025
 O1 0.025     0.025     0.025     0.025     0.025     0.025     0.025     0.025     0.025     0.025
 O1 0.055     0.055     0.055     0.055     0.055     0.055      0.11      0.11      0.11      0.11
 O1  0.11      0.11       0.5       0.5       0.5       0.5       0.5       0.5      0.11      0.11
 O1  0.11      0.11      0.11      0.11     0.055     0.055     0.055     0.055     0.055     0.055
 O1 0.055     0.055     0.055     0.055     0.055     0.055     0.025     0.025     0.025     0.025
 O1 0.025     0.025     0.025     0.025     0.025     0.025     0.025     0.025     0.025     0.025
 O1 0.025     0.025     0.025     0.025
 T                                                             1.5      0.15
 W2                0.36
 X     -1.0     -0.05       2.0
 K       1       DAM
 K1              ROUTE DISCHARGE THRU DAM
 Y                                             1         1
 Y1      1                                                  -528.0        -1
 Y4  528.0     528.5     529.0     529.6     530.0     531.0     532.0     533.0     534.0     535.0
 Y5      0         6      16.8      34.4      42.2      57.1      68.9      77.0      85.0      90.0
 $A      0     17.45     31.22     38.11
 $E    520       527       540       560
 $$  528.0
 $D  530.1      2.63       1.5       443
 $B    100         1     521.8       1.0     528.0     528.9
 K       1         1                                               1
 K1            CHANNEL ROUTING REACH 1
 Y                                             1         1
 Y1      1
 Y6    0.1     0.035       0.1     516.0     526.9       335     0.017
 Y7      0     525.9        35     522.4        75     518.5       100     516.0       140     516.0
 Y7    180     521.5       200     524.2       220     526.9
 K       1         2                                               1
 K1            CHANNEL ROUTING REACH 2
 Y                                             1         1
 Y1      1
 Y6    0.1     0.035       0.1     510.0     530.0      1165     0.005
 Y7      0       530        50       525       100       523       150       510       250       510
 Y7    300       523       350       525       400       530
 K       1         3                                               1
 K1            CHANNEL ROUTING REACH 3
 Y                                             1         1
 Y1      1
 Y6    0.1     0.035       0.1       502       512      1900     0.004
 Y7      0     520.5       300     516.3       600       512       610       502       625       502
 Y7    635       512       835     514.5      1035       517
 K      99
 A
```

HYDROGRAPH ROUTING

ROUTE DISCHARGE THRU DAM

ISTAO	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
DAM	1	0	0	0	0	0	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP		LSTR
0.0	0.000	0.00	1	1	0	0		0

	NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
	1	0	0	0.000	0.000	0.000	-528.	-1

STAGE	528.00	528.50	529.00	529.60	530.00	531.00	532.00	533.00	534.00	535.00
FLOW	0.00	6.00	16.80	34.40	42.20	57.10	68.90	77.00	85.00	90.00
SURFACE AREA=	0.	17.	31.	38.						
CAPACITY=	0.	41.	353.	1045.						
ELEVATION=	520.	527.	540.	560.						

CREL	SPWID	COOW	EXPW	ELEVL	COOL	CAREA	EXPL
528.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COOD	EXPD	DAMWID
530.1	2.6	1.5	443.

DAM BREACH DATA

BRWID	Z	ELBM	IFAIL	WSEL	FAILEL
100.	1.00	521.80	1.00	528.00	528.90

BEGIN DAM FAILURE AT 18.67 HOURS

PEAK OUTFLOW IS 1508. AT TIME 19.46 HOURS

RATIOS APPLIED TO FLOWS

OPERATION	STATION	AREA	PLAN	RATIO 1
				1.00
HYDROGRAPH AT	LAKE	.10	1	175.
		(.26)		(4.94)((
ROUTED TO	DAM	.10	1	1486.
		(.26)		(42.07)((
ROUTED TO	1	.10	1	1504.
		(.26)		(42.58)(
ROUTED TO	2	.10	1	1481.
		(.26)		(41.93)(
ROUTED TO	3	.10	1	1457.
		(.26)		(41.25)(

1 SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	528.00	528.00	530.10
STORAGE	59.	59.	99.
OUTFLOW	0.	0.	44.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	528.94	0.00	76.	1508.	0.00	19.46	18.67

PLAN 1 STATION 1

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
1.00	1504.	518.7	19.50

PLAN 1 STATION 2

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
1.00	1481.	512.5	19.50

PLAN 1 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
1.00	1457.	510.1	19.50

1**********

APPENDIX 5

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